

Green Infrastructure

As cities and communities grow, homes and roads are developed, ultimately covering soil with concrete and asphalt. While this creates accessibility for the growing community, water is unable to infiltrate into the ground



causing problems such as floods, increased erosion and runoff that is polluted¹. Green infrastructure can help your company manage stormwater more sustainably and use it to divert water for useful purposes such as growing vegetation.

[Green Infrastructure](#)² (GI) as defined by the EPA is a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. GI treats stormwater at its source while delivering environmental, social and economic benefits.

Below are simple practices that your company can use to implement green infrastructure.

- **Rainwater Harvesting**
Rainwater harvesting systems collect and store rainfall for later use. Collected rainwater can be used as a substitute for traditional irrigation methods and can help save money on water bills.
- **Downspout Disconnection**
Downspout disconnection reroutes rooftop drainage pipes from draining rainwater into the sewer while redirecting it into rain barrels, or reservoirs, permeable areas.
- **Bioswales**
These are areas of vegetated, mulched, or xeriscaped channels that provide treatment and retention as storm water moves from place to another. Bioswales slow, infiltrate and filter stormwater flows. Typically these features are linear and are placed along streets and parking lots.
- **Permeable Pavements**
Permeable pavements allow rain and snowmelt to seep through the surface into the ground. These pavements infiltrate, treat and/or store rainwater where it falls. Pavements can be made of pervious concrete, porous asphalt or permeable interlocking pavers.
- **Green Roofs**
Green roofs are covered with vegetation that enable rainfall infiltration, evapotranspiration of stored water and reduce stormwater runoff. Green roofs also help regulate internal building temperatures and reduce the overall heat island effect. These roofs work well in dense urban areas where land values are high and where storm water management costs are likely to be high.
- **Rain gardens (Bioretention)**
Rain gardens, also known as bioretention or bioinfiltration are shallow, vegetated basins that collect, absorb and remove pollution from runoff on rooftops, sidewalks and streets. These gardens are versatile and can be installed in almost any unpaved space. Implementing rain gardens or bioretentions can decrease costs required for construction storm water conveyance systems.
- **Green Parking**
Integrated GI into parking lots. This includes permeable pavements, bioswales in the medians and along the parking perimeter, rainwater harvesting, and downspout disconnections

[Green Infrastructure Wizard \(GIWiz\) Tool](#)³

Use EPA's Green Infrastructure Wizard tool to access tools and resources that can support and promote water management and community planning decisions.



Want to Learn More?

Listen in to EPA's [Green Infrastructure Webcasts](#)⁴ to hear upcoming and past topics such as:

- Building the Case for Green Infrastructure: Outreach and Education
- Lessons Learned in Green Infrastructure
- Greening Vacant Lots
- Winter Weather O&M for Green Infrastructure
- Green Infrastructure for Arid Communities
- Green Infrastructure for Localized Flood Management
- Green Infrastructure and Smart Growth

Other Calculators and Tools

- The [National Stormwater Calculator](#)⁵ assesses databases that provide soil, topography, rainfall and evaporation information for the chosen site.
- [Storm Water Management Model \(SWMM\)](#)⁶ is used for planning, analysis and design related to stormwater runoff, combined and sanitary sewers and in urban areas.
- [Green Infrastructure Flexible Model \(GIFMod\)](#)⁷ is an open-source framework for modeling urban stormwater and agricultural GI practices.

A Case Study

[Green Infrastructure Barriers and Opportunities in Phoenix, Arizona](#)⁸

This case study conducted by EPA, the City of Phoenix and several consultants evaluates GI barriers and opportunities for the city of Phoenix. The document looks at local codes and ordinances and offers example language to address GI barriers.

References

- ¹ Watershed Management Group. *Green Infrastructure for Southwestern Neighborhoods*: https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/WMG_Green%20Infrastructure%20for%20Southwestern%20Neighborhoods.pdf.
- ² EPA. Green Infrastructure. *What is Green Infrastructure*: <https://www.epa.gov/green-infrastructure/what-green-infrastructure>.
- ³ Green Infrastructure Wizard: <https://cfpub.epa.gov/giwiz/>.
- ⁴ Green Infrastructure Webcast Series: <https://www.epa.gov/green-infrastructure/green-infrastructure-webcast-series>.
- ⁵ EPA National Stormwater Calculator: <https://www.epa.gov/water-research/national-stormwater-calculator>.
- ⁶ EPA Storm Water Management Model: <https://www.epa.gov/water-research/storm-water-management-model-swmm>.
- ⁷ Green Infrastructure Flexible Model: <http://gifmod.com/>.
- ⁸ *Green Infrastructure Barriers and Opportunities in Phoenix, AZ*: https://www.epa.gov/sites/production/files/2015-10/documents/phoenix_gi_evaluation.pdf.

Additional references

- US Green Building Council. *Green Infrastructure: Back to Basics*: <http://www.usgbc.org/articles/green-infrastructure-back-basics>.
- National Resource Defense Council. *Encourage Green Infrastructure*: <https://www.nrdc.org/issues/encourage-green-infrastructure>.
- State University of New York. College of Environmental and Forestry. *Green Infrastructure Initiative*: <http://www.esf.edu/outreach/gi/>.
- EPA. *Green Infrastructure in Arid and Semi-Arid Climates - Adapting innovative stormwater management to the water-limited West*: http://www.azwater.gov/azdwr/WaterManagement/documents/10504-08AridClimatesCaseStudy_v2.pdf.
- EPA. *Green Infrastructure Strategic Agenda 2013*: <https://www.epa.gov/sites/production/files/2015-10/>